

TITLE PAGE

Response to the

Call for Nominations for the 2004 EPA Watershed Initiative:

Nashua River Watershed: HUC Code 01070004

“Protecting Today’s Water for Tomorrow:

Combating Threats to Source Water in the Squannacook – Nissitissit Sub-basin of the

Nashua River Watershed in Massachusetts & New Hampshire”

Submitted by

Nashua River Watershed Association (NRWA)

in Partnership with

Beaver Brook Association (BBA), New England Forestry Foundation (NEFF),

Trust for Public Land (TPL)

and a broad inter-state coalition of stakeholders

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[This Nomination is not devoted to hypoxia in the Gulf of Mexico.]

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150 WORD ABSTRACT

Threats to drinking water in Squannacook-Nissitissit sub-basin of the Nashua River watershed in MA & NH will be addressed proactively through 1) increasing incentives to individual and municipal forest landowners to voluntarily expand their stewardship and land protection; 2) exploring market-based opportunity for collective landowners through a forestry cooperative; 3) increasing incentives for foresters to receive training in ecological approaches; 4) providing practical model conservation & restoration sites; 5) developing forward-looking smart growth regulatory approaches at the municipal and state level; 6) providing baseline water quality information; and 7) utilizing new understanding of why some landowners can be resistant to pro-activity. These ready-to-start studies stem from the completed EPA-funded Source Water Stewardship Demonstration Project & utilize the sound science of the new UMass model to prioritize land parcels for drinking water protection. Consistent with the Nashua River watershed *Five Year Action Plan*, these studies are undertaken with a broad coalition.

Introduction: Characterization of the Watershed & Watershed Planning Effort

The Nashua River watershed encompasses 31 communities in north central MA and southern NH. Nearly 240,000 people live and work within its 538 square miles. Still largely rural at the edge of a major metropolitan area, the watershed is over 60% forested. Sharply increasing pressures from rapid growth and the resultant decline of open space contribute to two overarching water problems: non-point source pollution of the surface waters and increasingly compromised groundwater supplies.

The Nashua River watershed is comprised of 22 sub-basins that can be grouped into 4 major sub-basins: 1) North Nashua Major Sub. includes 2 cities and often does not meet water quality standards due to CSO's being addressed; 2) Wachusett Reservoir Major Sub. passes drinking water for metropolitan Boston through its Reservoir; 3) The Squannacook-Nissitissit Major Sub. still contains high quality water, yet is threatened by rapid development & is on MA DEP "alert" status; 4) Main Stem Nashua Major Sub. is troubled by land-use patterns, point and non-point source pollution including serious nutrient issues.

The *Five Year Action Plan for the Nashua River Watershed 2003–2008 (Plan)* produced by the former MA Watershed Initiative Nashua Team and the NRWA incorporates assessments, plans, and viewpoints from federal, state, and local agencies as well as other stakeholders (see NRWA web-site). The overarching long-term goals are 1) Maintain the high level of water quality in the tributaries and return degraded waters to their designated uses pursuant to state water quality standards; 2) Protect and manage in-stream flow and groundwater resources throughout the watershed to provide high quality drinking water supply sources and aquatic and riparian habitat; and 3) Support local growth planning efforts and encourage careful land use with well-planned development in order to protect priority land areas for forest, agriculture, habitat, water resources, and recreational values. In the *Plan*, each of the 22 sub-basins is characterized and has its own short- and long-term goals and priority projects. The subject area of this ecosystem-based EPA proposal is two of these sub-basins comprising about 25% of the watershed:

The Squannacook and Nissitissit Rivers are major tributaries to the Nashua River, and their health is of key overall importance to the whole watershed. The combined **Squannacook-Nissitissit sub-basin** is 132 square miles, includes headwaters, and spans 4 counties, 5 MA towns (Ashby, Groton, Pepperell, Shirley, Townsend), and 6 NH towns (Brookline, Greenville, Hollis, Mason, Milford, New Ipswich). In the *Plan*, these two sub-basins are characterized as “relatively pristine watersheds but sensitive to encroaching development.” The MA portion is designated Outstanding Resource Waters as cold-water fisheries; the ‘02 ACEC identified key resources and 20+ rare or endangered species. Based on an ‘02 Hydrologic Analysis, both sub-basins are showing net deficits in Aug. & 7Q10 flows. Numerous medium and high yield stratified drift groundwater aquifers are the primary drinking water sources, and the Witches Brook aquifer is considered a groundwater source of statewide significance by MA DCR. About 30,000 people are served by 21 public water systems in MA; 23 in NH. The growth rate in the MA towns is projected to be 25-40% through 2010; in the NH towns 70-140%. Build out analyses by MA EOEa project water demand to far exceed safe yields of groundwater resources, and little Zone I public water supply land is protected despite DEP requirements. New development poses threats to water from sodium & chloride; pesticides & fertilizers; fecal coliform; and chemicals & solvents. Impervious surfaces are about 7% (studies suggest 10% is the threshold % to protect water resources). About 79% of the Squannacook sub-basin is forested and 66% of the Nissitissit sub-basin (studies suggest 75% as the threshold % to protect water resources). Forest land overall is only 0-25% actively managed. The *Plan* calls for protection of the water resources through approaches recommended in the 2001-2003 Source Water Stewardship Demonstration Project.

Description of the Proposed Study Projects

This aggregation of 7 EPA WI study projects undertaken together will protect water resources – primarily drinking water – in an area where groundwater and surface water are closely linked. All 7 projects flow from the Source Water Stewardship Demonstration Project (SWSD): in 2001 the NRWA and partners successfully sought to have the Squannacook-Nissitissit sub-basin *chosen as one of four sites nationally* to

merit a SWSD Project by TPL, USDA Forest Service, and UMass funded by EPA. Phase I involved intensive assessment & data analysis, summarized in the "Issues Report" Dec. '02 (see NRWA web-site). The centerpiece of Phase I was the development of a unique, innovative model by UMass to show through sound science which parcels should receive highest priority for conservation; what areas most need restoration using riparian forest buffers; and where stormwater management practices will yield the greatest improvements in water quality ("Issues Report"). In Phase II a Team of water resources experts participated in a one-week Stewardship Exchange May '03 to develop actions to address existing and possible future impacts. The NRWA served *pro bono* as the local coordinator of an inter-state coalition of water suppliers, land trusts, municipalities, state & federal agency representatives, planning commissions and other stakeholders that participated throughout and worked closely with the Exchange Team. The resultant "Stewardship Exchange Team Report" (see NRWA web-site) conveyed a strong sense of urgency. Concurrently, Northeast Rural Water Association integrated info from Source Water Assessments and Protection Plans (SWAPS) undertaken in each town. With the successful completion of Phase I & II drawing the initial project to a close, the coalition reconvened in July '03 to identify key projects to carry the demonstration forward with NRWA's facilitation. The 7 study projects outlined below stem from completed comprehensive assessment & planning, address the identified threats, and are 100% ready to launch.

1. Land Stewardship & Land Protection Project (\$401,940 EPA-WI; \$269,154 match)

Goal: Educate targeted property owners & remove barriers to their performance as stewards; Complete forest & farm management plans or ecological assessments on at least 10% of the currently unprotected priority lands; move willing landowners toward permanent land protection where appropriate, including in Zones I and II. **Tasks:** Each owner of forest land identified as key to protecting water resources through the UMass model will be invited into programs structured to inform them of the potential ecological values of their property & their options for its stewardship & protection. Innovative incentives for participation will be identified, such as management plans done for reduced costs and the right to draw on

a “bank” of *pro bono* or reduced cost legal assistance for protecting priority lands. MA landowners will already have received initial attention through the ‘03 “Land Owner Outreach Program” designed for this project and funded by Anderson Foundation & EPA. NH landowners will receive their first attention through the EPA WI grant. Each municipal Conservation Commission, land trust, and conservation organization active in the sub-basin will be alerted to the detailed assessments developed in the Phase I of the SWSD Project along with other complementary assessments. As appropriate, priority parcels will be watched for and actively pursued for permanent land protection. Smaller, non-forested parcels of key concern in Zone I & II areas also will be pursued for stewardship and/or permanent protection. Project partners will collaborate with agencies that can contribute financially to land protection. EPA funds will *not* be used for acquisition. The partners have already been working to protect the Pepperell Springs property on Gulf Brook (265 acres) and secured a commitment for \$1.4 million Forest Legacy funding. The rationale for protecting this property and the coalition’s activities will be documented through a Case Study that can be shared with others trying to leverage successful projects. **Schedule:** Initial NH forest/farm land owner contact fall ‘04 and continued ‘05-‘07; MA forest/farm land owner contact continued; Zone I & II lands prioritized ‘05 and addressed ‘05-‘07; Pepperell Springs property secured by ‘06; Case Study disseminated. **Environmental Milestones:** 1st management plan and/or ecological assessment completed; 1/4 of targeted land owners have taken a step toward education or action; 1st Zone I or II lands protected; 1st deal secured for a permanently protected priority parcel. **Budget notes:** NRWA lead; TPL & NEFF contract. Contractual costs include NRWA’s GIS consultant. **Match:** *Pro-bono* legal service from attorneys Barrett, Johnson, Levite, Lyons, Morrison, Page, Vander Linden, reduced cost ecological assessments from MassAudubon, Black, Lisk, & Veit; assistance from TPL; assistance from ACEC Stewardship Com. and Pepperell Springs Preservation Com.; partial value of town’s contribution to Pepperell Springs purchase; cash from Pepperell ConsCom; volunteer time from Groton & Townsend Conservation Land Trusts; Ashby, Townsend & Shirley ConsComs; assistance O’Connor, Jackson, Luchonok, Chisholm, Carr, & Fletcher.

2. Market-Based Forestry Cooperative Project (\$70,680 EPA-WI; \$19,080 match)

Goals: Develop a model structure through which owners of forest land can receive increased financial benefits from stewarding their property, and thereby be more resistant to selling their forest land to development; Move forestry from volume to value; Raise the bar of good management practices. **Tasks:** Establish a Forestry Cooperative Advisory Working Group; address anticipated knowledge & equipment needs; identify 12-15 potential participants with enough collective board feet (mbf) to sell; convene landowners, land trusts, & managers of town forests; determine best business form & develop a business plan. Local markets (e.g., pallets at Devens) & 'green seal' incentives (e.g., EcoStar Program) will be explored. The deliverable is an assessment of feasibility in the sub-basin. **Schedule:** Work Group winter '05; draft business plan fall '05; feasibility assessed '06. **Environmental Milestones:** Participants convened; Business Plan resolved. **Budget Notes:** NEFF lead/contract; NRWA assist. **Match:** consulting foresters Nute & Kittredge; environmental planners Lowitt & Carr; attorneys Schott, Anctil, & Daddario.

3. Forester Training Project (\$14,340 EPA-WI; \$3,690 match)

Goal: Educate foresters and resource managers who operate in the sub-basin to understand and communicate to their clients the message that forests have community and public values regarding water protection beyond merely the obvious stumpage or economic values. **Tasks:** Conduct annual workshops for 20+ foresters through which they can earn Continuing Education Units (arranged through Mt. Wachusett Community College Forest Wood Products Institute); a number of CEUs are annually mandated to maintain state licenses in MA & NH. Workshops will focus on the impact of forestry on water quality protection and introduce the concept of fuller stewardship inventories that have a more holistic, ecological reach than traditional forest management plans: "green-smart wood" skills will be included. **Schedule:** Annual workshops '05-'07. **Environmental Milestones:** Half the trained foresters begin to market themselves as including ecological inventorying; 1st client utilizing new approach. **Budget Notes:** NEFF lead/contract; NRWA assist; BBA contract. **Match:** NRWA *pro bono* "Guide to Ecological Inventories" published '03.

4. Conservation Restoration & Demonstration Projects (\$14,760 EPA-WI; \$13,500 match)

Goal: Provide tangible examples for landowners of practical methods to remedy common conservation problems in the sub-basin that threaten to negatively impact water resources, thereby increasing landowner stewardship. **Tasks:** Utilize identified sites that reflect: a) successful forest management at BBA; b) techniques for restoring wetlands compromised by invasive plant species at BBA & Pine properties; c) riparian buffer on agricultural land at BBA. Targeted landowners, municipalities, land trusts, and the interested public will be invited to visit the sites for workshops and hands-on participation; accompanying educational print materials and press attention will be generated. N.E. Wild Flower Soc. will provide an invasives workshop to support site utilization. **Schedule:** 1 workshop per each site summers '05, '06, '07. **Environmental Milestones:** 1st BMP, plan, or restoration undertaken by a property owner; subsequent practices or restorations. **Budget Notes:** BBA lead/contract. NRWA assist. **Match:** BBA volunteers at sites; Pine's labor, equipment, & plant costs at site; NEWFS workshop; and technical assistant from NEFF.

5. Smart Growth Policy Project (\$280,840 EPA-WI; \$40,750 match)

Goals: Develop and present innovative approaches to regulatory resource protection on the local and state levels; Educate municipal boards on resource-based model by-laws; innovative land use planning; conservation finance. Increase communication and coordination across town and state boundaries. **Tasks:** Municipal boards will receive individualized attention to introduce them to the NRWA's "By-Law Project." Groundwater protection district bylaws, model septic & road salt policies will be highlighted as key in this sub-basin. Novel approaches & policies will be considered, such as developing an "MOU" between water suppliers and landholders in the Zone I area to require notification of change of use, and thus an opportunity to consider purchase. Innovative regulations such as Transfer of Development Rights will be presented as appropriate on a town-by-town basis. Workshops on relevant topics such as conservation-based zoning will be offered. Dialogue across town boundaries will be encouraged through Interest Groups. On the state level, new policies that provide incentives to landowners will be considered, such as levying an

8% stumpage tax on land clearing where in the income stream could be directed toward open space funding. The benefits of extending the MA Squannacook and Nissitissit Rivers Sanctuary Act (1975) into NH will be highlighted to NH policy-makers. Opportunities to develop inter-state policy initiatives around such topics as river front protection, lakefront protection, in-stream flow will be pursued. Appropriate inter-state Task Forces will be established and educational materials generated. EPA funds will be used for assisting in the technical development of local ordinances or state policy & concurrent education, but not to influence the passage of ordinances or policy. **Schedule:** Policy Working Group convened fall '04; Circuit Rider hired fall '04; Dialogue with each municipal board established by winter '05; Interest Groups & Task Forces formed spring '05; education on entire range of possibilities simultaneously; topics dealt with in order requested by the municipalities '04-'07. **Environmental Milestones:** 1st steps taken by policy-makers to forward policy options; 1st improved policy option in place. **Budget Notes:** NRWA lead; TPL & NEFF contract. **Match:** *Pro bono* consultants Carr, Lowitt & Fletcher; workshops by 3 planning commissions -- NRPC, NMCOG, and MRPC; additional *pro bono* technical assistance from TPL on conservation finance & technical assistance from NEFF.

6. Public Survey & Messaging Project (\$18,720 EPA-WI; \$33,125 match)

Goal: Identify why there is resistance to proactive measures to protect clean water. **Tasks:** Work with Asst. Prof. Muth of UMass Dept. of Natural Resources Conservation to shape a series of questions, e.g.: "Why won't land owners accept increased taxes/fees that would go toward purchasing Zone I land to protect water supplies?" Statistically significant public surveys and interviews will capture results. Insights will shape EPA study projects #1-5 above. The Exchange Team report emphasizes the need for appropriate public education, and results of this project will help to shape all educational materials developed. **Schedule:** Tools deployed '05; analyzed '05. **Environmental Milestones:** 1st example of message influencing a positive action in projects #1-5. **Budget Notes:** NRWA lead *pro bono*; UMass consultant contract; **Match:** Prof Muth's & his colleague's time; messages re link between land protection &

water quality mailed in utility bills from Pepperell, Townsend, & W. Groton Water Depts. & Witches Brook Water Co.; NRWA lead & outreach assistance.

7. Water Quality Sampling Project (\$65,394 EPA-WI; \$21,876 match)

Goals: Provide baseline data on nutrient loading to and from the Squannacook & Nissitissit Rivers that is integral to long-term measurement of the impact of the EPA WI collection of study projects; Fill gaps in current knowledge of actual loadings from small tributaries to the Squannacook & Nissitissit Rivers, and, in turn, loading from these major rivers to the Main Stem. Nutrients, especially phosphorous, have been identified as a large problem in the Main Stem & its Pepperell Pond area, but the actual role of nonpoint sources from the Squannacook is not clear. No storm water samples have been taken previously. **Tasks:** Finalize QA/QC; Sample nutrients including nitrogen & phosphorus, fecal coliform, and *E. coli* as well as turbidity & conductivity; 3 storm water sampling events at 3 sites (2 near significantly developed areas & 1 undeveloped site) and 15 sites once a month for 7 months for non-storm events. The NRWA will draw on its Volunteer Water Quality Monitoring program, which has completed its 11th consecutive season of sampling and whose data are used as appropriate by MA DEP and EPA. Clark Univ. Prof. Downs will do graduate student project of a pollution dispersion model. **Schedule:** QA/QC written fall '04; Samples '05; Data into STORET Fall '05. **Environmental Milestones:** Data Gaps filled and baseline established. **Budget Notes:** NRWA lead. "Supplies" include costs of nutrient samples processed by commercial labs. **Match:** Fecal coliform & *E. coli* processed *pro bono* by Pepperell WWTP; volunteers' time collecting samples & working in lab; Clark University project professor & student *pro bono* time; H&V Co. cash.

Monitoring and Evaluation

A primary environmental performance measure for these proactive studies combating threats is the amount of Phosphorous, Nitrogen, and Total Suspended Solids that is prevented from entering the waterways because key land parcels are permanently protected. Calculations will be made using the Watershed Analyst tool coefficients. For example, protection of the forested Pepperell Springs 265 acre

property from low-density development results in preventing 391 lbs. phosphorous, 1,389 lbs. nitrogen, & 86,125 lbs. TSS from entering Gulf Brook on its way to the Nissitissit & Main Stem **per year**. Also:

- # of acres of priority forest lands permanently protected;
- # of forest management plans or ecological assessments completed;
- # of acres of land in Zone I & II's protected;
- # of acres of impervious surface avoided

Additional infrastructural and implementational measurements include:

- # of strengthened or new municipal by-laws, regulations, or practices adopted;
- # of strengthened or new state policies adopted or under serious consideration;
- # of landowners who have undertaken restoration projects; attend workshops, participate
- # of sampling sites where data has been collected; # of coalition partners involved

Project Alignment

This project aligns with: Federal Clean Water Act; Safe Drinking Water Act; SWAPS in each community; EPA-funded Source Water Stewardship Demonstration Project; Forest Legacy Program; NH DES Watershed Assistance Section; MA Water Assets Program; MA Executive Order 418; MA Squannassit & Petapawag ACECs. It also aligns with *Five Year Action Plan*, NRWA's *2020 Vision* and regional plans from MRPC, NMCOG, and NRPC, along with town open space plans.

Project Management

PARTNERS: The **Nashua River Watershed Association** will be the grantee and will be responsible for administration of the grant work plan and for being the fiscal agent receiving the funds. The NRWA, founded 1969, is a non-profit based in Groton, MA that works for a healthy ecosystem with clean water and open spaces for human and wildlife communities, where people work together to sustain mutual economic and environmental well-being in the Nashua River watershed (www.NashuaRiverWatershed.org). The NRWA's Executive Director Elizabeth Ainsley Campbell is responsible for project oversight. Ms. Campbell has led the NRWA for 9 years, and has designed and managed many projects with federal & state funding, including the multi-year "Communities Connected by Water" partnership project. **Beaver Brook Association**, founded 1964, is a New Hampshire non-profit with 2,000 acres in Hollis, Brookline &

Milford and a mission to promote understanding of interrelationships in the natural world and encourage conservation of natural resources through education and land stewardship (www.beaverbrook.org). **New England Forestry Foundation**, founded 1944, is a regional non-profit dedicated to the conservation and sustainable management of the private and municipal forestlands in N.E. (www.neforestry.org). NEFF accomplishments included establishing the largest conservation easement in history to protect northern forests. The **Trust for Public Land**, founded 1972, is a national non-profit that protects land for human enjoyment and well-being (www.tpl.org). TPL accomplishments include protection of 1.4 million acres in 45 states and new ways to finance open space protection. **A BROAD INTER-STATE COALITION** of active stakeholders in the SWSD Project & EPA WI project include 53 providing match as noted in study projects #1-7 above and cover the 11 Municipalities; 4 Water Suppliers, 3 Planning Agencies; 8 Land Trusts; 10 Conservation Organizations or Task Forces; 3 Universities; 1 Business; 9 Attorneys; 10 Professional Individuals; and state agencies (NH DES; MA EOEA, DCR, Food & Ag, Fish & Game, Riverways, ACEC).

Outreach Activities

Intensive outreach within the Squannacook-Nissitissit is an integral component of each of the 7 projects as described above, and will reach diverse constituencies through a variety of techniques including workshops, neighborhood meetings, interest groups, advisory groups, one-on-one, direct mail, messages in utility bills, flyers, library displays, & extensive local press coverage, and will be supported by the Coalition.

Knowledge will be transferred beyond the Squannacook-Nissitissit through existing vehicles: MA Watershed Coalition list-serve & Annual Conference; MA Land Trust Coalition list-serve & Annual Conference; MA Environmental Collaborative list-serve and Strategy Sessions; UMass Annual Watershed Conference, NH Rivers Council Meetings, Clean Water Fund N.E. Conference; National Land Trust Alliance Conference; and similar vehicles. NEFF has contacts throughout New England; TPL promotes its model programs nationally; and NRWA is a member of River Network. Partner newsletters and web-sites will also be utilized. Partners will attend EPA WI Conference (noted on Budget as Project #8).

Table 1. BUDGET INFORMATION - EPA Watershed Initiative Grant Program
EPA Watershed Initiative "Protecting Today's Water for Tomorrow: Combating Threats to Source Water
in the Squannacook – Nissitissit Sub-basin of the Nashua River Watershed in Massachusetts & New Hampshire"

SECTION A - BUDGET SUMMARY

Watershed Project, Activity or Work Plan Element	Federal	Non-Federal	Total
1. Land Stewardship & Land Protection Project	401,940	269,154	671,094
2. Market-Based Forestry Cooperative Project	70,680	19,080	89,760
3. Forester Training Project	14,340	3,690	18,030
4. Conservation, Restoration & Demonstration Project	14,760	13,500	28,260
5. Smart Growth Policy Project	280,840	40,750	321,590
6. Public Survey & Messaging Project	18,720	33,125	51,845
7. Water Quality Sampling Project	65,394	21,876	87,270
8. EPA WI Conference	3,600		3,600
Totals	\$ 870,274	\$ 401,175	\$ 1,271,449

SECTION B - BUDGET CATEGORIES

Budget Categories	Watershed Project, Activity, of Work Plan Element								TOTAL
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
a. Personnel	186,500	18,000	2,500	3,000	151,000	6,000	16,150	0	383,150
b. Fringe Benefits	55,950	5,400	750	900	44,700	0	4,845	0	112,545
c. Travel	2,500	1,000	200	200	12,500	100	3,000	3,000	22,500
d. Equipment	0	0	0	0	0	0	2,500	0	2,500
e. Supplies	20,000	3,000	1,000	3,000	4,000	500	28,000	0	59,500
f. Contractual	70,000	31,500	7,500	5,200	24,000	15,000	21,876	0	175,076
g. Construction	0	0	0	0	0	0	0	0	0
h. Other	269,154	19,080	3,690	13,500	38,750	27,125	0	0	371,299
i. Total Direct Charges (sum line a-h)	\$604,104	\$77,980	\$15,640	\$25,800	\$274,950	\$48,725	\$76,371	\$3,000	\$1,126,570
j. Indirect Charges	66,990	11,780	2,390	2,460	46,640	3,120	10,899	600	144,879
TOTALS (sum line i-j)	\$671,094	\$89,760	\$18,030	\$28,260	\$321,590	\$51,845	\$87,270	\$3,600	\$1,271,449